Navigation Improvement Study

Reconnaissance Report

Pig Island Gut
Beals, Maine

US Army Corps
of Engineers
New England Division

REPORT DOCUMENTATION PAGE

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This report examined the feasibility of modifying the existing Federal project to improve channel conditions and provide sufficient mooring space for the commercial fishing fleet in Pig Island Gut, Beals, Maine. The report determined present conditions, opportunities for improvement, Federal and local interests in the project, and cost estimates for plan design. The plan involves a spur channel and a 3.3 acre anchorage, both 6 feet deep at mean low water (MLW), and modifications to existing channel bends and entrance areas. Project costs are estimated at $480,000 with $21,000 related to non-Federal work for berthing space at the end of the town dock. Annual benefits are estimated at $60,000 and annual costs are estimated at $48,600, which results in a benefit to cost ratio of 1.2, making it possible to recommend for further study.

Also appended are supporting documentation for Economic Analysis, Environmental Concerns and Pertinent Correspondence.

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PIG ISLAND GUT NAVIGATION IMPROVEMENT STUDY

BEALS, MAINE

RECONNAISSANCE REPORT

February 1989

SYLLABUS

This report is the result of a Reconnaissance Study, for Pig Island Gut in Beals, Maine, which examined the feasibility of modifying the existing Federal project to improve channel conditions and provide sufficient mooring space for the commercial fishing fleet. The reconnaissance was accomplished under the authority of Section 107 of the 1960 River and Harbor Act, as amended, for Small Navigation Projects. This study, which was conducted using Federal funds, accomplished the following:

- assessed the extent of the navigation problem;
- determined if there was an economically viable solution to the problem;
- determined if there was a Federal interest in the solution;
- and determined if there was a willingness on the part of the local interests to share the cost of the final phase of the study and construction of a project.

The evaluated plan involves a spur channel that would be 6 feet deep at mean low water (MLW) and a 3.3 acre anchorage, 6 feet deep at MLW, in the town dock area of Alley Bay. The plan also includes making various modifications to the existing channel bends and entrance areas. The cost of completing this work is estimated at $480,000, representing an annual cost of $48,600. Of this total cost, $21,000 is related to non-Federal work for the provision of berthing space at the end of the town dock. Annual benefits were estimated at $60,000 resulting in a benefit-cost ratio of 1.2 making it possible to recommend for further study.

This report summarizes the existing conditions, opportunities for improvement, the rationale for plan formulation, design and cost estimates, and cost/benefit analysis. Also appended are supporting documentation for Economic Analysis, Environmental Concerns and Pertinent Correspondence.

The next phase of study, known as a feasibility study, may be initiated providing the local sponsor is prepared to cost share in the study. The feasibility study would consist of determining the best solution to the problem, conducting environmental studies for preparing an Environmental Assessment in accordance with the National Environmental Policy Act (NEPA), and preparing a Local Cooperation Agreement with the local sponsor for project implementation.

Navigation Improvement Study
Pig Island Gut
Beals, Maine

Reconnaissance Report

Table of Contents

PIG ISLAND GUT
RECONNAISSANCE REPORT

EXISTING CONDITIONS

As can be seen in Figure 1, Pig Island Gut is a passage located between Pig Island and the Great Wass Island in the town of Beals, Maine. The town of Beals, in Washington County, is comprised of a group of islands on the coast of Maine, just a half mile south of Jonesport and approximately 75 miles east of Bangor.

Land access to Beals and vicinity is provided by U.S. Route 1. Direct access to Beals is provided via state route 187. Sea access to Pig Island Gut is through Alley Bay to the west and Eastern Bay to the east (see Figure 2). The town boat landing, located on the north shore of the Great Wass Island, has access to the existing 6-foot deep Federal channel through the Gut.

Pig Island Gut is home to a growing commercial fishing fleet. Approximately 40 fishing boats use the Gut area as a fishing base during the peak season. Another 25 boats from nearby Jonesport regularly use the Gut in transit to the fishing grounds. While most of the fleet is drydocked during the winter, several boats from Beals as well as from Jonesport continue to fish during this time; using Pig Island Gut to reach open waters.

PRIOR STUDIES AND IMPROVEMENTS

Pig Island Gut was the subject of an earlier report prepared in April 1963 under the authority of the River and Harbor Act of 1960. The study concluded that further examination of navigation improvement to Pig Island Gut was warranted. A Detailed Project Report was initiated and later authorized 10 July 1964. The report recommended dredging a channel 60 feet wide and 6 feet deep at MLW from Alley Bay to Eastern Bay through Pig Island Gut and an anchorage 5.5 acres and 6 feet deep at MLW within the Gut. A Federal project followed and was constructed in 1965. It provided a channel 80 feet wide and 6 feet deep as well as 5.5 acres of anchorage space within the Gut. The existing Federal Project is shown in Figure 3.

PROBLEMS AND WITHOUT PROJECT CONDITION

Pig Island Gut provides the shortest, least exposed route for vessels navigating from the anchorages at Beals and Jonesport to fishing grounds in the southeast. The anchorage within the Gut provides mooring space for approximately 21 fishing boats. Current problems at Pig Island Gut are:

- A lack of sufficient anchorage space. Due to the expansion of the commercial fishing fleet since the original Section 107 project was constructed in 1965, 19 boats have been forced to anchor in shallow waters in the Alley Bay area. Vessels anchoring in this area are subject to grounding out and experience increased damages as well as tidal delays.

- The need for improved channel dimensions. Since construction in 1965, the average boat size has increased thereby making it difficult for boats from Beals and Jonesport to navigate the channel even during mean low water conditions. This has also led to increased vessel damage and tidal delays.

- The lack of a proper access channel to the town boat landing. The fishing fleet at Beals experiences damages and delays as they make their approach for loading and offloading.

The without project condition is expected to be a continuation of the existing conditions and an escalation of operating difficulties for the commercial fishing fleet.

PLAN FORMULATION RATIONALE

The current problems experienced by the Beals fleet as well as those Jonesport boats that use the Gut, could be reduced or eliminated by providing additional anchorage space and improved channel accessibility.

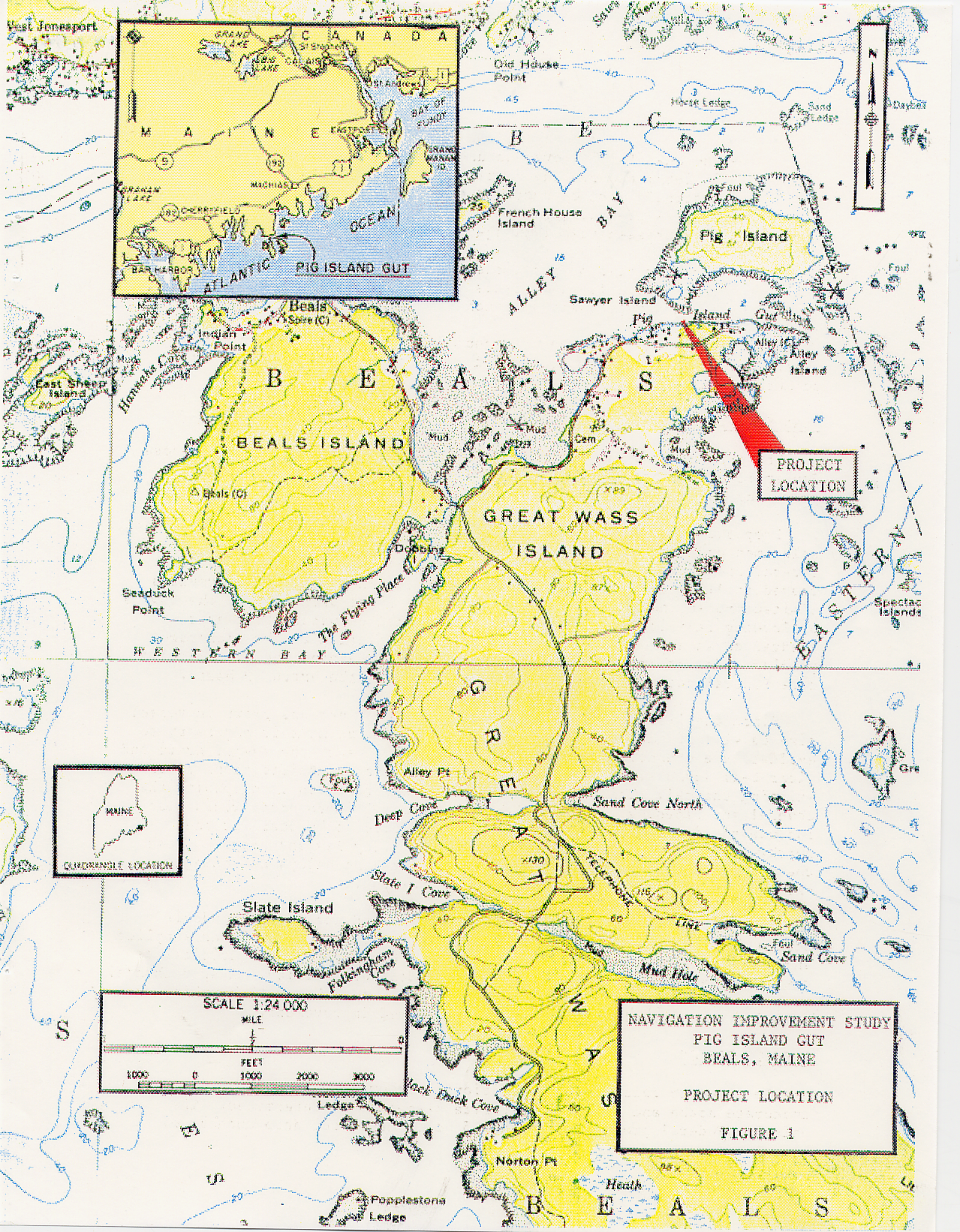
Proposed layouts of additional anchorage were discussed with the town selectmen and harbormaster. Currently 21 vessels moor in the 5.5 acre Federal anchorage during the peak season. The remaining 19 boats are moored in Alley Bay opposite the town boat landing. This area provides limited protection, but was selected for its close proximity to the town's offloading facilities. Although currently shallow water, this area, dredged to an appropriate depth, is an ideal solution to the anchorage problem. The other alternative discussed was to expand the existing 5.5 acre Federal anchorage in the Gut to accommodate the extra 19 boats.

Since the 1965 project was constructed, the fleet has grown in vessel size as well as number. This increase in boat size made it necessary to evaluate the channel's current configuration. Due to the deeper draft and wider beam vessels, it is necessary to make certain modifications to the existing channel. This would include such alternatives as deepening the channel and widening the channel bends. Channel improvement would also include placing a day marker on a hazardous pile of boulders at the northwest corner of the existing unimproved Alley Bay anchorage. These channel modifications would serve to eliminate the delays and damages experienced by fishing boats transitting the Gut.

Discussion with the town also revealed a need for more dependable access from the channel to the town landing where the fleet loads supplies and unloads their catch. Such access would become even more critical as the town plans to improve and expand this docking facility. A spur channel from the existing Federal channel to this area together with berthing area dredging at the landing is the locally desired improvement.

PROJECT DESIGN

In order to calculate the additional anchorage needs, the existing anchorage space and present fleet size needed to be determined. The existing Federal project supplied 5.5 acres of 6-foot deep anchorage.


CANADA
MAINE
BAY OF FUNDY
ATLANTIC OCEAN
PIG ISLAND GUT
BAR HARBOR
MACHIAS
CHERRYFIELD
EASTPORT
St Andrews
GRAND LAKE
West Jonesport
Old House Point
House Ledge
Sand Ledge
Daybea
French House Island
ALLEY BAY
Pig Island
Sawyer Island
Pig Island Gut
Alley Island
Beals
Indian Point
East Sheep Island
Hanacks Cove
BEALS
BEALS ISLAND
Beals (C)
Mud
Cem
PROJECT LOCATION
GREAT WASS ISLAND
Dobbins
The Flying Place
Seaduck Point
WESTERN BAY
EASTERN
Spectacle Islands
GREAT WASS
Alley Pt
Deep Cove
Sand Cove North
Slate I Cove
TELEPHONE LINE
Sand Cove
Mud Hole
Slate Island
Follingham Cove
Black Duck Cove
Norton Pt
Heath
Popplestone Ledge
Ledge
MAINE
QUADRANGLE LOCATION
SCALE 1:24 000
MILE
FEET
1000 0 1000 2000 3000
NAVIGATION IMPROVEMENT STUDY
PIG ISLAND GUT
BEALS, MAINE
PROJECT LOCATION
FIGURE 1

View to West toward Beals Island - Alley Bay in background

View to South toward Eastern Bay - Pig Island and Sawyer Island in foreground

AERIAL PHOTOGRAPHY

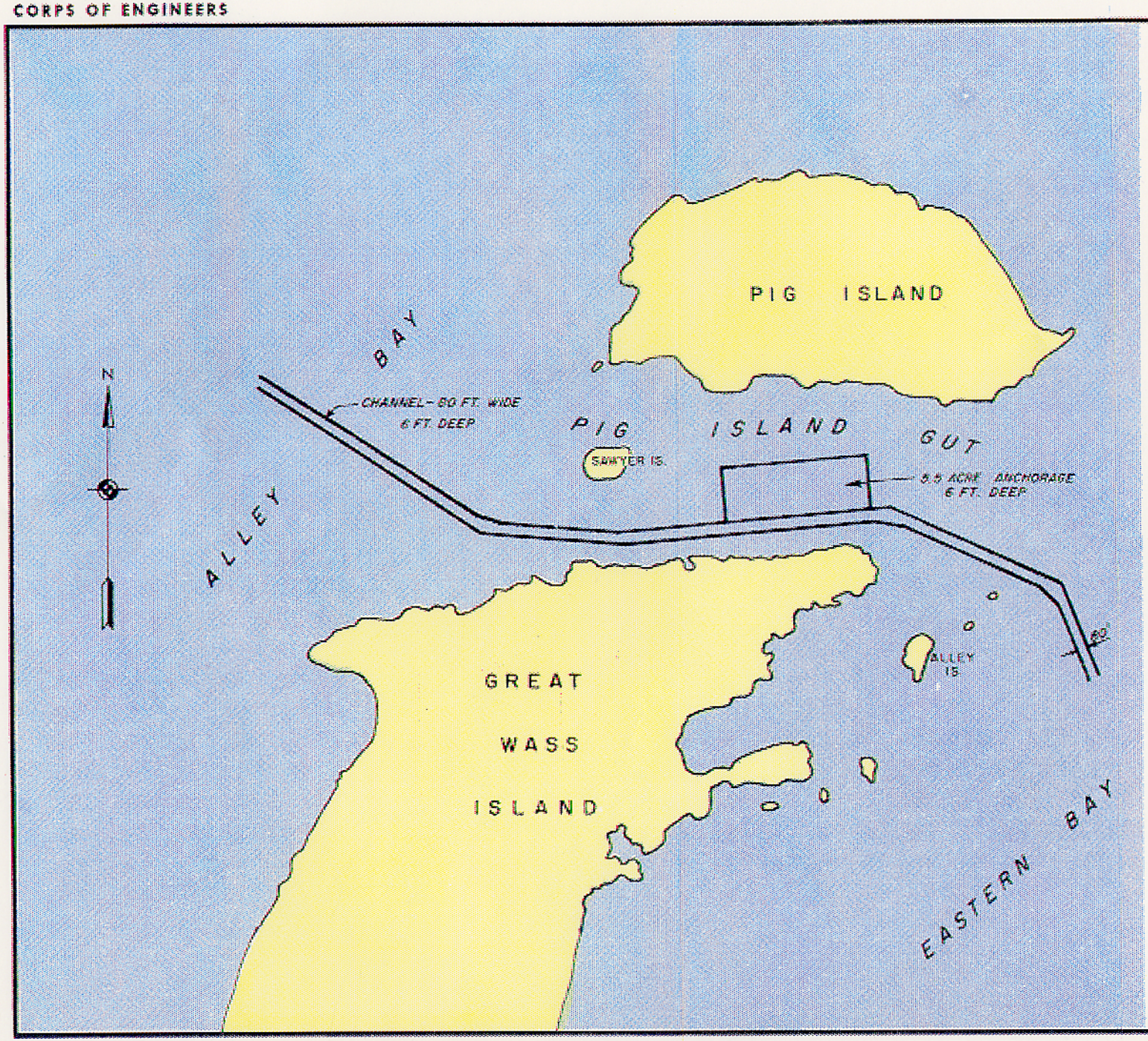
PIG ISLAND CUT
BEALS, MAINE

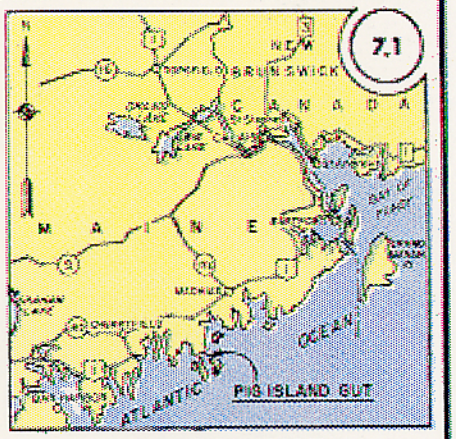
Photos taken October, 1985

FIGURE 2

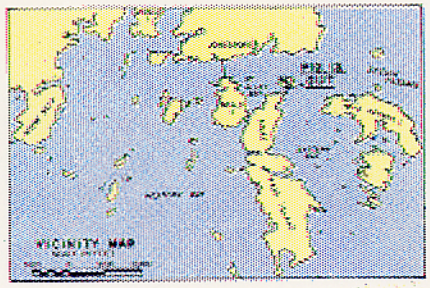
CORPS OF ENGINEERS

U.S. ARMY





LOCATION MAP



EXISTING
FEDERAL PROJECT

FIGURE 3

PIG ISLAND GUT
BEALS, MAINE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

The Beals fishing fleet is currently composed of 40 vessels. Fleet surveys revealed that approximately 34 boats have an average length of 35 feet and 6 boats had an average length of 17 feet. Using mooring swing radius calculations based on a 6-foot deep anchorage:

- each 35-foot long boat needs 11,310 square feet of anchorage

- each 17-foot long boat needs 5,542 square feet of anchorage

Approximately 10 percent reduction in available space was taken into account for mooring overlap and corners. Based on these requirements it was determined that 3.3 acres of additional 6-foot anchorage is needed to meet the current fleet's demand.

Using a design vessel with a beam of 11 feet, a length of 35 feet and a loaded draft of 4.5 feet, proper channel requirements were determined. A 4.5-foot loaded draft vessel would require approximately 3.5 feet of additional channel depth (1/2-foot for vessel squat, 1-foot for wave action and 2 feet for safety clearance). Therefore, an 8-foot deep channel at MLW would be the optimum design depth. The channel bends were also evaluated and found to be inadequate for these larger vessels, requiring that the bends be widened to provide safe turning clearance.

To provide access to the town boat landing a spur channel was incorporated into the plan. This spur channel leading to the berthing area at the town landing would be 80 feet wide and as deep as the existing channel it provides access to.

CONSIDERED ALTERNATIVES

Three alternatives incorporating the desired improvements, were examined. These alternative plans, equivalent in scope, vary in depth to which dredging will occur. The general plan of improvement can be seen in Figure 4.

Plan A - The addition of a new 6-foot anchorage, a new 6-foot spur channel and several modifications to the existing channel at the current 6-foot depth.

Plan B - The addition of a new 6-foot anchorage, a new 8-foot spur channel and deepening the existing channel to 8 feet plus channel modifications.

Plan C - The addition of a new 8-foot anchorage, a new 8-foot spur channel and deepening the existing channel to 8 feet plus channel modifications.

The improvement dredging will utilize a 1:3 side slope in ordinary material and 1:1 in rock. All dredging would include an allowable 1-foot overdepth for ordinary material and 2 feet for rock. The cost estimates for these plans are shown in Table 1. Quantity and cost estimates were based on a hydrographic survey completed in October 1987 and October 1988 price levels. For purposes of cost estimating, a subtidal disposal site on the west side of Pig Island was selected. Determination of the actual disposal area would be made in the Feasibility phase of the study.

TABLE 1
PIG ISLAND GUT
BEALS, MAINE

CONSTRUCTION COST ESTIMATES

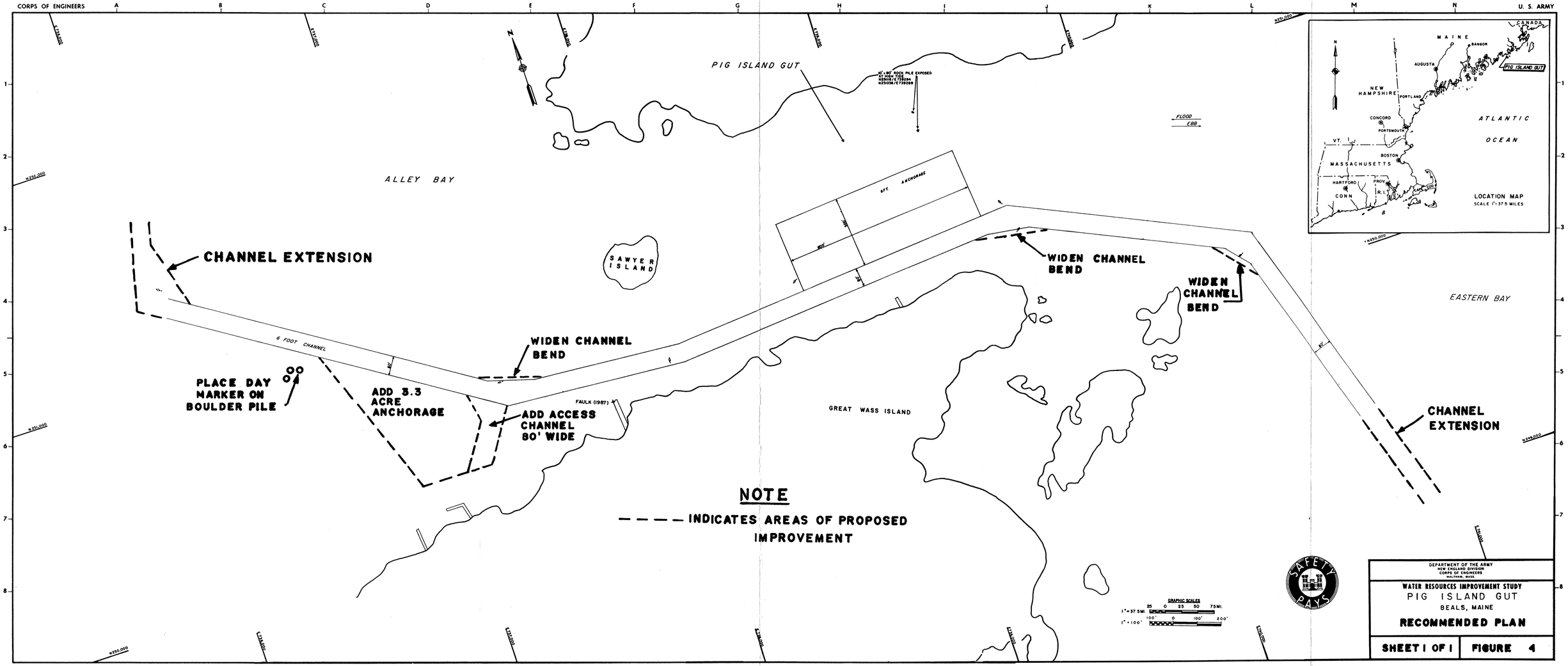
	Plan A	Plan B	Plan C
Construction Period (months)	1	2.3	2.6
Removal of Ordinary Material			
Quantity (cy)	26,010	71,360	83,650
*Unit Price ($/cy)	10.40	7.95	7.65
Contingencies	25%	25%	25%
Subtotal	$339,000	$709,000	$800,000
Removal of Rock			
Quantity (cy)	0	1,800	1,800
*Unit Price ($/cy)	-	78.00	78.00
Contingencies	-	25%	25%
Subtotal	0	$175,000	$175,000
Engineering & Design	30,000	32,000	32,000
Supervision & Administration	72,000	97,000	102,000
Total Initial Construction Cost	$441,000	$1,013,000	$1,109,000
Cost Apportionment			
** Non-Federal Share (20%)	$ 88,000	$203,000	$222,000
Federal Share: (80%)	$353,000	$810,000	$887,000

Notes:

* Unit price includes: Mobilization & Demobilization, Contractor's Overhead, Bond Cost, and Profit. Costs were based on 1988 price levels.

** At least 50% of this ammount is payable immediately prior to construction and up to 50% is payable in annual increments (including interest) over a period of up to 30 years.

CORPS OF ENGINEERS — U. S. ARMY



MAINTENANCE COSTS

Pig Island Gut is a naturally occurring passage between two islands. The opposing shore areas are rocky granite, while material within the channel area is composed of organic silts and sands. Over the 23 years since the completion of the Federal project in 1965 there has been no maintenance dredging performed on the channel and anchorage. It would appear that shoaling is not a problem in the area nor would shoaling rates in the existing project area be affected by this project.

Maintenance of the new Alley Bay anchorage and spur channel to their authorized depths would be necessary to ensure the continued efficiency of these dredged areas. Following initial dredging the anchorage would tend to shoal or fill in because of settlement of material from side slopes, deposition of material derived from upland erosion, and from current and tidal action. Based on current experience with the existing project such shoaling would be minimal over the project life. For purposes of economic analysis an annual shoaling rate of one percent of the improvement volume will be used. The annual cost for this maintenance is shown in Table 2.

RELATED NON-FEDERAL IMPROVEMENT

The town of Beals is responsible for the dredging of the berthing area located at the end of the town landing. The quantity and costs for this work are estimated as follows:

6-foot depth:	1530 cy @ $13.65/cy	= $21,000
8-foot depth:	2140 cy @ $10.45/cy	= $22,000

The annual costs for completing this work can be found in Table 2. Maintenance dredging is again based on an annual rate of one percent the improvement volume and is also included in the annual cost.

BENEFIT COST ANALYSIS

Assuming the proposed plan of improvement was constructed, benefits derived would be of two categories effecting commercial vessels, namely elimination of vessel damage resulting from inadequate anchorage, channel depth and configuration, and the elimination of tidal delays experienced during low tides.

Benefits were based on a commercial fleet in Beals of 40 vessels during the peak season (May-Dec) and 15 vessels during the winter season. Benefits were also claimed for 25 peak season vessels from nearby Jonesport that use Pig Island Gut. Only 10 vessels from Jonesport use the Gut during the winter season. There were no recreational benefits realized under any of these improvement plans.

TABLE 2
PIG ISLAND GUT
BEALS, MAINE

ANNUAL COSTS

	Plan A	Plan B	Plan C
Initial Construction Cost	$441,000	$1,013,000	$1,109,000
Non-Federal Improvement	21,000	22,000	22,000
Aids to Navigation	18,000	18,000	18,000
Total Initial Cost	$480,000	$1,053,000	$1,149,000
Interest During Construction	0	5,000	6,000
Total Investment	$480,000	$1,058,000	$1,155,000
Interest and Amortization 8 7/8 - 50 years	43,000	95,000	104,000
Maintenance Dredging	4,600	10,400	11,300
Maintenance of Navigation Aids	1,000	1,000	1,000
Total Annual Cost	$ 48,600	$106,400	$116,300

The annual costs for the improvement work can be found in Table 2. Annual benefits, as detailed in the attached Economic appendix, are summarized as follows:

	Plan A	Plan B	Plan C
Elimination of Vessel Damage	$ 8,000	$ 19,000	$ 19,000
Elimination of Tidal Delays	52,000	87,250	87,250
TOTAL	$ 60,000	$106,250	$106,250

The benefit-cost analysis is shown below:

Annual Benefit	$ 60,000	$106,250	$106,250
Annual Cost	$ 48,600	$106,400	$116,300
Benefit-Cost Ratio	1.2	1.00	0.91
Net Benefit	$ 11,400	$ 0	$ 0

ENVIRONMENTAL FINDINGS

Initial coordination with Federal, state and local agencies have revealed no unreasonable environmental issues. The reconnaissance investigations described in the Environmental appendix conclude that any impacts to shellfish, lobster and eelgrass populations in the dredged areas would be minor. Impacts to the disposal area vary according to which disposal option is used. At this stage of study, the Pig Island disposal site would generate minimal environmental impacts. However, final determination of the disposal site will occur during the feasibility study.

SUMMARY OF LOCAL INVOLVEMENT

The town of Beals first expressed interest in the project with a letter to New England Division, Corps of Engineers, in December 1986. A well attended informationsl session was held with the public at large on 24 February 1987. A formal request for a Section 107 study was made by the town in a letter dated 2 March 1987. Since that time Corps representatives have had several discussions with the town Selectmen.

Should a feasibility study be conducted, an Executive Committee, consisting of Corps and local sponsor representatives would be appointed to direct and oversee the course of the study.

CONCLUSIONS

The navigation problems at Pig Island Gut in Beals, Maine have been studied and alternatives to alleviate these concerns have been formulated. Based upon reconnaissance level study, an engineeringly feasible, economiclly justified and environmentally acceptable possible solution, Plan A, has been developed.

Reconnaissance level analysis indicates that sufficient benefit would acrue with the implementation of Plan A to warrant a more detailed feasibility study. Federal policy guidelines state that the reconnaissance

phase of a study consists of all work and analysis required to determine whether there is a Federal interest in conducting further planning studies and to obtain necessary agreements with the local sponsor. The local sponsor, the town of Beals, is reviewing the Feasibility Cost Sharing Agreement and the Scope of Services as detailed in the last section of this report.

RECOMMENDATION

The Division Engineer recommends that a feasibility study be conducted under the Section 107 program authority for Pig Island Gut, Beals, Maine, and that this detailed study effort be cost shared on a 50-50 basis with the town of Beals.

Acknowledgment and Identification of Personnel

This report was prepared under the supervision and management of the following New England Division personnel:

Colonel Daniel M. Wilson, Division Engineer
Joseph L. Ignazio, Chief, Planning Division
Nicholas E. Avtges, Chief, Plan Formulation Branch
John T. Smith, Chief, Coastal Development Section

The study report was developed and prepared by Christopher L. Hatfield, Project Manager. Project team members are: Stephen Rubin, Economics; Pamela Rubinoff and Michael Walsh, Coastal Engineering; Terrence Fleming, Environmental; Ron DeFilippo, Geotechnical; Kate Atwood, Cultural Resources.

APPENDIX A

ECONOMIC ANALYSIS

Introduction (Study Area)

Pig Island Gut is a narrow passage between Pig and Great Wass Islands in the town of Beals Maine. Pig Island Gut is approximately 30 miles northeast of Bar Harbor and a half mile south of Moosabec Reach. Beals itself is just off the coast of Jonesport, Maine. The gut provides a shorter, less exposed route for commercial fishing vessels when they travel to fishing grounds to the Southeast.

Existing Conditions

In 1965, the Corps of Engineers completed a project in Pig Island Gut that provided a channel 80 feet wide by 6 feet deep and a small anchorage of 5.5 acres near the eastern end of the gut. Maintenance dredging has not taken place in the channel since the project was first constructed. For the purposes of this report, it is assumed that the area exists and is maintained at its specified dimensions.

The primary beneficiaries of the existing project are the commercial fishermen moored at Alley Bay in Beals, as well as the commercial vessels located near Jonesport which fish to the southeast. The current commercial fleet, at Alley Bay, numbers approximately 40 vessels during the main season (May-Dec); and approximately 15 vessels through the winter season. Approximately 25 vessels located near Jonesport use the gut during the main season.

As stated above, there are roughly 40 vessels in the Pig Island Gut/Alley Bay area. Currently there are approximately 10 vessels moored in the Federally dredged anchorage area. However, there would be room for 11 more vessels provided that the area was maintained properly. Therefore, it is assumed that 21 vessels are in the dredged anchorage area and the residual 19 are not moored in a dredged area. These 19 vessels are moored in Alley Bay. These vessels experience damages due to "bottoming out" where they are moored. They experience damages of keels, etc. because of these groundings. These vessels, as well as the rest of the fleet, also experience damages due to the channel depth and structure of the channel as well as tidal delays. By providing the improvements to the channel and providing the additional anchorage area we hope to eliminate these problems.

Methodology

There are three alternatives under consideration for alleviating the Pig Island Gut problems. Those three alternatives are listed below.

1. Alternative one - Modifications to existing 6' channel and bends. Providing a 6' spur channel to town float and dredging a new 6' Alley Bay anchorage (3.3 acres).

2. Alternative two - Modifications to existing 6' channel and bends. Enlarge existing 6' anchorage by 3.3 acres.

3. Alternative three - Deepen existing channel with modifications and bends to 8'. Provide an 8' spur channel to town float and 6' Alley Bay anchorage area (3.3 acres).

The current federal interest rate of 8 7/8% was used in the analysis to evaluate these alternatives.

Results of Fieldwork

Information provided by:
(1) Questionnairs distributed to and returned by local fisherman (20 vessels responded)
(2) Herman Blackman, Jr., Beals Harbormaster
(3) Russel Batson, Jonesport Harbormaster
(4) U.S.C.G. stationed at Jonesport

-Number of vessels fishing both seasons obtained from Beals and Jonesport Harbormaster.
-Delay time, number of delays, fuel consumption, and fuel prices obtained from all of the above.
-Approximately 19 vessels use Alley Bay for anchoring during the peak season (May-Dec; 8 months): approximately 15 fish during the winter.
-Conversations with the Harbormaster revealed that vessels that don't fish in the winter are hauled out of the water. Therefore, there would be room for all in the dredged anchorage area. Thus, no benefits can be taken from the winter fleet.
-Crew size (provided by questionnaire):
The large boats have 2 crew members; the smaller boats have 1 crew member.
-Crew salaries (median manufacturing wage rate was used):
$8.80 per hour.
-Owner's salaries (transportation industry wage rate):
$9.40 per hour.
-Number of delays per month: 8 days.
Average length of delay: 2 hours.
-Damage information:
number of vessels reporting damages: 20
total repairs: $8,787.50
average cost : (total/# of vessels) $440

*Breakdown of damages $440
$220 - anchorage area (50% of total)
$220 - channel damage (50% of total)
.25 x 220 = $55 caused by bends
.75 x 220 = $165 caused by depth
*All damage information represents annual figures.

Benefit Analysis

A. Alternative One.

Benefits represent the elimination of tidal delays, damages caused due to groundings, as well as damages caused due to inadequate bends in the channel.

1. Tidal Delays - lost fishing opportunities.
   - -Tidal delays inhibit fishing opportunities for local fisherman in Beals. They experience a 2 hour delay 8 days per month. Benefits are calculated as the opportunity costs of this time as well as fuel costs.
   - -Boat owners: # of boats x wage rate ($9.40) x length of delay x # of delays/months x 8 months
     19 boats x $9.40 x 2 hrs x 8 days x 8 mo. = $22,860.80
   - -Crew members: # of crew x wage rate ($8.80) x length of delay x # of delays/month x 8 months
     19 men x $8.80 x 2 hrs x 8 days x 8 mo. = $21,401.60
   - -Fuel costs: # of boats x price/gallon x # of gal./hr x length of delay x delays/month x 8 months
     19 boats x $1.01 x 3 gal/hr x 2 hrs x 8 days x 8 mo = $7368.96

   Total Delays = $52,000 (approximately)

2. Damages Prevented

   There are three types of damages prevented by this alternative. First, damages to 19 vessels occurred in Alley Bay caused by inadequate anchorage area depth. Second, damages to Alley Bay and "Gut" boats caused by the inadequate bend clearance in the channel.
   Third, damages to Jonesport vessels were also caused by this bend problem.

   a) Alley Bay Boats (anchorage area)
      19 x $220 ave. per vessel per year = $4180
   b) Alley Bay and "Gut" boat bends in the channel
      40 x $55 ave. per vessel caused by bends = $2200
   c) Jonesport
      25 x $55 ave. per vessel caused by bends = $1375

      Total Damages Prevented = $7755

Total Benefits from Alternative One = $60,000

B. Alternative Two

The benefits realized from implementing alternative two would be roughly the same as Alternative One due to the similarities of the proposals.

Total Benefits from Alternative Two = $60,000

C. Alternative Three

This alternative involves deepening the federal channel as well as providing additional anchorage area. The original channel was dredged at 6' MLW, however, this depth has now become inadequate. Over the years, the average size and drafts of vessels has increased. Today, the average draft is between 4'-4.5'. However, there are other

depth requirements. The breakdown follows:

Feet requirement	Reason
4.0-4.5 ft	draft of vessel
2.0 ft	safety clearance required
1.0 ft	wave action
.5 ft	"squatting"-as a boat moves, it draws more water
7.5-8.0 ft	channel depth required

Because the channel is only 6' MLW, vessels experience damages in the channel as well as delays when the tides fall below MLW. This plan eliminates:

1) lowest low water delays
2) lowest low water delays for Jonesport vessels
3) 75% of channel damages to Beals and Jonesport Fleets

This plan also picks up all benefits gained from alternative one.

1. Lowest Low Water (Beals Boat)

This accounts for an additional three delays per month in the channel transit at 1.25 hours per delay.

-total hr. cost of delays = owners salaries/hr + crew salaries/hr + (cost of fuel/gal x # gal/hr)
$9.40 + $8.80 + (1.01 x 3) = $21.23/hr

-summer: # of vessels x total cost/hr x # hrs/delay x # of delays/month x 8 months
40 x $21.23 x 1.25 hrs x 3 delays x 8 mo = $25,476

-winter: # of vessels x total cost/hr x # hrs/delay x # of delays/month x 4 months
15 x $21.23 x 1.25 hrs x 3 delays x 4 months = $4,776.75

Total = $30,250.00

2. Lowest Low Water (Jonesport vessels)

At lowest of low tides, the Jonesport vessels can't use the channel. They must sail their vessel around, thus adding 20 minutes sailing time.

-summer: # of vessels x % hr delay x total cost/hr x # of delays/month x # of months
25 boats x .33hr x $21.23 x 3 days x 8 months = $4,203.54

-winter: # of vessels x % hr delay x total cost/hr x # of delays/month x # of months
10 x .33hr x $21.23 x 3 days x 4 months = $840.70

Total Jonesport vessels = $5,000.00

3. Damage Prevented

The damages prevented would be the 75% of the channel damages ($165 per vessel per year) not taken care of in alternative one or two.

Beals:	40 vessels x $165	= $ 6,600.00
Jonesport:	25 vessels x $165	= $ 4,125.00
	Total damages prevented	= $11,000.00
	Total additional benefits	$46,250.00

Total benefits, Alt. 3: Alt. 1 + $46,250
60,000 + $46,250 = $106,250.00

APPENDIX B

ENVIRONMENTAL CONCERNS

Project Description

Pig Island Gut is located in northeast coastal Maine, in the town of Beals.

The project under consideration consists of removal of rocks from an existing 6-foot deep by 80-foot wide Federal channel, declaration of a Federal project, and deepening an existing anchorage south of the channel at the northwest point of Great Wass Island. A new anchorage is proposed in Alley Bay is along the western end of the existing federal anchorage.

Disposal options are still being considered at this stage of the project. The preferred options involve the beneficial use of dredge material for the creation of an intertidal flat area. The locations under consideration include 1) A large mudflat located in Alley Bay 2) the Sheeps Island disposal site and 3) natural depressions in the ledge on the east side and West side of Pig Island (Figure 1). Ocean and upland disposal options will also be considered.

Initial Coordination

The following people were contacted during the development of this report and should be coordinated with as the study progresses:

Mr. Malcom Richards, Maine Dept of Marine Resources
Mr. Ronald Joseph, U.S. Fish and Wildlife Service
Mr. Douglas Beach, National Marine Fisheries Service
Mr. Chris Mantzaris, National Marine Fisheries Service

A site visit was made on 10 September 1987, to evaluate the habitat types in the area. In attendence were the following people:

Terry Fleming IAB
Larry Oliver IAB
Malcolm Richards, Maine Dept of Marine Resources
Issacs Beals, Selectman, Town of Beals

Environmental Setting

Habitat types within the project area include marine deepwater habitat with both rock bottom and unconsolidated bottom (sand and mud), vegetated shallows, intertidal flats, rocky shores and surrounding upland habitats. Ledge material extends into the gut from the east and west sides of Pig Island. The shoreline area is a mix of rocky outcroppings (primarily along the east and west sides of Pig Island), low energy beaches (portions of Great Wass Island) and mudflats (south side of Pig Island and portions of Great Wass Island).

Dredge Area. Sediment samples were taken with a 0.04 m2 Van Veen grab from various locations within the project area (See Figure 2) for locations). Grabs taken from within the gut (Stations 2 a,b,c) consisted of fine sand with some eelgrass. The gut is characterized as a medium velocity tidal channel (FWS, 1980). The sediments in the east and west

portions of the channel and in the proposed anchorage area are finer than those in the Gut itself and consist of silt-clay material. This reflects the lower tidal energy in the open area of Alley Bay as opposed to the constricted passage through the gut.

Sediments in the grabs were sieved through a 1.0-mm mesh sieve, the animals retained were identified using the microscope in the laboratory. The fine sand contained numerous polychaete and arthropods. The dominant polychaete species were Polydora ligni, Nephtys incisa, Nereis diversicolor, Capitella spp, and Scoloplos robustus. The arthropod population was dominated by amphipods, primarily Ampelisca spp and Corophium spp.

The muddy areas (Station 1 and Anchorage area) contained a much less diverse assemblage of organisms. They were more heavily dominated by polychaetes, especially the spionids Polydora ligni and Streblospio benedicti.

Disposal Site Options. A disposal site for material generated during dredging operation has yet to be determined.

Intertidal disposal

The tidal flat adjacent to the proposed anchorage in Alley Bay has been used previously for the disposal of dredged material. The flat is located between Beal's Island and the Northwestern shore of Great Wass Island. A small tidal channel connects Western Bay to Alley Bay. The upland habitat surrounding the flat consists of rocky shoreline and fringe saltmarsh.

This particular mudflat is a heterogeneous area with numerous resources including wormflats, clam flats, eelgrass beds and mussel banks. Soft shell clams (Mya arenaria) are abundant along the high and mid-intertidal area or the flats. There is a high density of juvenile clams in the area and signs of recent digging were observed during site visitations in March and September, 1987. This area supports a diverse assemblage of polychaetes, bivalves and arthropods. In addition to Mya, the amphipod Corophium volutator is highly abundant. This species is a favorite prey item for shorebirds. The dominant polychaete species were Clymenella torquata, Eteone longa, and Nereis diversicolor.

In the mid to low intertidal portion of the flats sediments change from sand to mud substrate. Commercially valuable marine worms such as the sand worm (Nereis spp.) and blood worms (Glycera spp.) are harvested from these areas. Worms are also harvested along the flats to the east of Beals Island. In addition to these species polychaetes such as Polydora, Streblospio, Capitella spp., Eteone, and Nephtys are abundant. Rocky outcroppings in the area are covered with knotted wrack (Fucus spp and Ascophyllum nodusom).

There is a gravelly bar in the center of the flats at mid-tide level consisting of poorly sorted sand and gravel, which may be the remains of the previous dredge material. The finer sediments were presumably carried

away over time leaving the coarser material. Mussels (Mytilus edulis) have been able to colonize the area. This in turn has provided hard substrate for colonization by knotted wrack and some barnacles.

A large eelgrass bed, east of the gravel bar, extends from the low intertidal to the subtidal shallows. Eelgrass are considered and important ecological resource, because they provide a habitat and refuge for numerous invertebrate species including scallops. The importance of Zostera beds as a spawning and nursery bed for finfish and shellfish is reflected by the legal protection it is afforded in 40 CFR 230.43.

Disposal in this area is likely to have an adverse impact on one or more of these resources.

The Army Corps of Engineers is currently involved in a dredging project in Jonesport. Material form this project is to be used for the creation of an intertidal flat on the south side of Sheep Island. Since this area has already been designated for disposal and it is within one half mile of Pig Island Gut, it should also be considered as a potential disposal site. The biological environment was assessed 22 October 1985 (See Hubbard and Oliver, 1985). Field observations identify the area as sandy substrate with boulders and intermittent eelgrass stands. Sediments in this area consist silty-sand with fine particulate detritus that has accumulated around the base of eelgrass (Zostera marina) culms. The dominant organisms were the oligochaete Peloscolex sp, and polychaetes such as Tharyx acutus and Capitella spp. Larger organisms such as the sea cucumber, Cucumaria frondosa and the polychaete, Nephtys incisa were also abundant.

The local sponsor raised interest in the possibility of using the dredge material to create an intertidal flats on Pig Island. They identified two possible locations one on the east side and one on the west side of the island. These areas are natural coves created by depressions in the bedrock Ledge. The ledge material exhibits a typical intertidal zonation with barnacles, mussels and fucus moving from the high intertidal to the low tideline.

Much of the ledge which forms the cove on the east side of the island is subtidal. There is a tidal inlet in the ledge at the western most side of the cove which is only uncovered at the lowest tides. Sediments change from a coarse sand and shell material near the inlet to a muddier bottom in the subtidal. This change in sediment type probably stems from higher current velocity and shallower water depths at the inlet.

The disposal site on the west side of the island is formed by the ledge in between Pig Island and Sawyer Island. Sediments in this area were a silty-sand with shell material. This site is more protected than the east side site, therefore more likely to retain the dredged material than the other site.

Ocean disposal.

The closest ocean disposal area approved by the EPA is located in Rockland Maine, which is located 50 miles southeast of Beals. Three historic disposal sites have been identified in the area. The nearest is located to the East of Mark Island, approximately 3 to 4 miles east of the project area. Another site is located in Narraguagus Bay, approximately 9 miles southwest of the area. The third possible site is located in Machias Bay, approximately 12 miles northeast of the area.

Upland disposal.

An upland disposal site has not been provided by the local sponsor.

Environmental Resources

Lobsters. Lobsters (Homarus americanus) are a major commercial resource for the area. They are abundant in the coastal waters om Maine, generally being foun on bottoms that provide shelter in the form of rock crevices (rock bottom), plant life (aquatic beds) or the potential to dig a burrow (unconsolidated bottom). Lobsters undergo a seasonal migration, moving inshore in the warmer months. They spawn and reproduce in the summer and early fall. During the winter months lobsters return to deeper waters offshore. The fishery is economically important to the residents of Beals. Local interests are constructing a new lobster pound on the northwest point of Great Wass Island, near the proposed anchorage.

Scallops. Scallops are another important commercial resource in the area. Scallops are present in the deeper waters of the area. Established beds are known to occur within much of Moosabec Reach and the area between Sheeps Island and Head Harbor Island (FWS, 1980). Spawning occurs in the area from July to October, with peaks in late August.

Finfish. Coastal fish populations are dominated by demersal marine and estuarine species. Data from nearshore and estuarine surveys indicate that the most common fishes are the herrings, flounders, codfish, sculpins, skates, rainbow smelt, wrymouth, rockgunnel, redfish and the American eel (FWS, 1980).

Eelgrass. Patches of eelgrass are found within the vegetated shallows of the proposed anchorage area. These will have to be quantified during the DPR stage of the project. Eelgrass beds also occur in the Alley Bay Flats (an area proposed as a possible disposal site).

Soft Shell Clams. Soft shell clams are abundant in the tidal flats located on the south side of Pig Island (adjacent to the project area) and on the east and northeastern of the island. There are also extensive clamflats in the intertidal areas between Beal Island and Great Wass Island (possible disposal area).

Worm Flats. The marine worms Glycera dribranchiata and Nereis diversicolor are two commercially valuable species that are harvested from intertidal flats within the area.

Birds. The islands in the area support overwintering bald eagle, dabbling ducks, and diving ducks; nesting osprey and black guillemont and adult concentrations of shorebirds and migratory shorebirds. Buffleheads, red breasted mergansers, scaup and herring and black-backed gulls were observed during the field inspection. The tidal flats around Alley bay are inportant to water fowl. The flats act as a feeding area for various shorebirds such as the semipalmated plover, the blackbellied plover and the semipalmated sandpiper.

Threatened and Endangered Species.

Preliminary endangered species coordination with National marine Fisheries Service indicates that humpback and fin whales and possibly right whales may be present in the project area (NMFS pers. com. 6 May 1987). Of particular concern are the areas being considered for ocean disposal.

Fish and Wildlife Service coordination suggests that nesting bald eagles and fall migrant peregrine falcons are present as well. The presence of these endangered species necessitates that a section 7 consultation be prepared concurrent with the environmental assessment.

Marine Mammals.

Harbor seals and harbor porpoises also frequent the area. Several seal haulouts are found in close proximity to the project area. As these species are protected by the Marine Mammal Protection Act potential impacts to these species will have to be addressed or mitigated against in the environmental assessment.

Archaeological and Historic Resources

There are three known historic shipwrecks located in the vicinity of Beals, Maine. None of these shipwrecks, or any other known historic or archaeological resources are within the impact area of the proposed navigation improvement project. This project will have no effect upon any structure or site of historic, architectural or archaeological significance, as defined by the National Historic Preservation Act of 1966. The Maine Historic Preservation Commission has reviewed the proposed navigation improvement project and has concurred with this finding.

A disposal site for the dredged materials has not yet been selected. A determination of effect must be made for the area when a disposal site has been selected.

Professional Opinions and Environmental Recommendations

Dredging. The major environmental resources that could potentially be impacted are shellfish (soft shell clams and scallops), lobsters, and eelgrass. Given the small size of the project we believe the dredging can be accomplished without major impact on these resources. Some mitigation (probably in the form of dredging windows) may be required to minimize potential impacts.

Intertidal disposal. Beneficial use of dredged material in the intertidal falls under 404 (b) (1) guidelines.

Alley Bay Flats. Disposal of a hydraulic slurry in the marine environment is likely to have severe negative impact on environmental resources. Therefore, we do not recommend using this site for disposal. However this site might be acceptable should the dredging technology change such that the dredged material could be barged to this site. There would still be negative impacts but they would be more localized. The effects of such disposal could be defined and mitigated. We would recommend that the exact disposal area be clearly defined and marked prior to disposal to minimize the number of resources impacted.

Sheep Island. For the reasons cited above we do not recommend pipeline disposal at this location. Should the disposal technology change, this cite should be evaluated based on the experience gained in the Jonesport project.

Pig Island. We believe that hydraulically dredged material could be disposed of at these sites with minimal environmental effects provided that silt curtains are positioned across the mouth of the coves to contain suspended material. We would recommend buttressing the mouth of the coves with rock dikes to ensure that the material stays. A detailed site evaluation would be required prior to using this area for disposal.

Ocean disposal. The use of ocean disposal sites is incompatible with hydraulic dredging. Should the dredging technology change we would recommend further consideration of ocean disposal. All three historic sites mentioned (Narraguagas Harbor, Machias Bay, and Western Bay) mentioned are subject to 103 guidelines. Designating a site for disposal could be coupled with other Corps dredging projects in the area (Jonesport, Bucks Harbor, Bass Harbor, Bar Harbor).

Cost Estimate for Environmental.

The actual cost for the environmental input to the detailed project report ultimately depends on the disposal site chosen. In general the options which consider ocean disposal will incur expenses associated with the increased difficulty of environmental sampling (e.g. shiptime). On the other hand, the resources in the intertidal areas have an immediate commercial value and there will be costs associated with determining the value of these resources (e.g. shellfish census).

The predicted cost of the environmental assessment is approximately $18,000. This figure includes environmental sampling and analysis of both the dredging and disposal site, interagency coordination, preparation of the environmental assessment, 404 (b) 1 permit, water quality and CZM consistency.

References

U.S. Fish and Wildlife Service 1980. Atlantic Coast Ecological Inventory.

U.S. Fish and Wildlife Service 1980. An Ecological Characterization of Coastal Maine.

U.S. Army Corps of Engineers 1985. Biological Report on Jonesport Harbor disposal site. Prepared by W. Hubbard and L. Oliver, Impact Analysis Branch Files.

Benthic Species List

Station #1

Oligochaetes

Polychaetes
Polydora ligni
Capitella spp
Phyllodocid spp

Arthropods
Ampelisca spp
Corophium spp

Station #2

Oligochaetes

Polychaetes
Polydora ligni
Capitella
Nephtys
Nereis
Scoloplos
Polynoid

Arthropods
Ampelisca spp
Corophium spp

Anchorage area

Oligochaetes

Polychaetes
Polydora ligni
Streblospio benedicti
Nereis spp
Ampharetid spp

Arthropods
Ampelisca spp

Disposal Area Alley Bay (Worm Flat)

Oligochaetes

Polychaetes
Polydora ligni
Streblospio benedicti
Capitella
Clymenella torquata
Eteone longa
Phyllodocid spp
Nereis

Station #2 (cont.)

Arthropods
Idotea baltica
Ampelisca spp
Corophium spp

Disposal Area Alley Bay (Clam Flat)

Oligochaete

Polychaetes
Clymenella torquata
Eteone longa
Phyllodocid spp
Nereis spp

Arthropods
Corophium spp

Bivalves
Mya arenaria

APPENDIX C

PERTINENT CORRESPONDENCE

OFFICE OF SELECTMEN

BEALS, MAINE 04611

Beals, Maine 04611
March 2, 1987

Colonel Thomas A. Rhen
Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02254-9149

Dear Colonel Rhen:

A committee of local fishermen has advised us of several navigation problems within the waters of the Town of Beals. These concerns include the need for adequate anchorage with sufficient water depth at low tide and the removal of channel obstructions which interfere with the passage of vessels through the Pig Island Waterway at low tide.

We would appreciate your efforts to alleviate these problems. We are hereby requesting a study of navigation improvements to the harbor at Pig Island Gut under the authority of Section 107 of the Rivers and Harbor Act of 1960 as amended.

Respectfully submitted,
The Board of Selectmen
Town of Beals, Maine

Harleigh A. Alley
Harleigh A. Alley, 1st.

Terry L. B. Feeney
Terry L. B. Feeney, 2nd

Daniel F. Davis
Daniel F. Davis, 3rd

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510

January 5, 1987

Colonel Thomas A. Rhen
Division Engineer, New England
Division
United States Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Colonel Rhen:

I am writing on behalf of a proposed dredging project submitted by Mr. Maurice Alley on behalf of the community of Beals, Maine.

Dredging is necessary to alleviate the present overcrowded condition and allow the increased number of boats using the channel to be moored safely.

I would appreciate it if you would give this proposal your fullest consideration.

With best regards.

Sincerely,

George Mitchell

George J. Mitchell
United States Senator

COMMITTEES:
FOREIGN AFFAIRS
JOINT ECONOMIC COMMITTEE
SELECT COMMITTEE ON AGING

WASHINGTON OFFICE:
2464 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-1902
(202) 225-6306

OLYMPIA J. SNOWE
2D DISTRICT, MAINE

Congress of the United States
House of Representatives
Washington, DC 20515

March 20, 1987

DISTRICT OFFICES:

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AUBURN, ME 04210-5813
(207) 786-2451

197 STATE STREET
POST OFFICE BOX 722
PRESQUE ISLE, ME 04769-0722
(207) 764-5124

Col. Thomas A. Rhen
Division Engineer
New England Division, Corps of Engineers
Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Col. Rhen:

I would like to take this opportunity to express my support for two dredging projects requested by the Town of Beals, Maine.

It is my understanding that the Town of Beals has asked the Corps to provide assistance with two separate dredging projects, at Beals Harbor and at Pig Island Gut. These two projects are of great importance to Beals, and I would like to request your assessment of them. In addition, I would appreciate learning what actions need to be taken before the Corps is able to respond to the Town of Beals' request.

Thank you for your attention to this matter.

Sincerely,

Olympia J. Snowe

OLYMPIA J. SNOWE
Member of Congress
2nd District, Maine

OJS:nml

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

Planning Division
Coastal Development Branch

Honorable Olympia J. Snowe
U.S. House of Representatives
Washington, D.C. 20515

Dear Ms. Snowe:

I am responding to your letter of March 20, 1987 which advises me of your support for two navigation projects in the town of Beals, Maine. We have received a letter from the town of Beals dated March 2, 1987 which requests that we investigate the need for maintenance of the local existing Federal navigation projects, as well as consideration of the possible expansion of navigation facilities at Pig Island Gut.

To address the possible need for project maintenance at both Beals Harbor and Pig Island Gut, a representative of our Operations Division will be meeting with local officials and project users to identify any difficulty they may be experiencing with these projects, which are depicted on the attached maps. Detailed hydrographic surveys will be performed if necessary. If maintenance dredging is needed, the work would be coordinated and performed as quickly as possible consistent with the availability of funds and needs of other navigation projects.

We have also initiated a reconnaisance study of navigation improvements at Pig Island Gut under the continuing authority of Section 107 of the 1960 River and Harbor Act (Public Law 86-645). A preliminary determination is scheduled to be completed in May 1987. We will advise you of our findings at that time.

Should you desire additional information, please contact me at (617) 647-8220 or the Project Manager, Mr. Charles Freeman at (617) 647-8549.

Sincerely,

Thomas A. Rhen
Colonel, Corps of Engineers
Division Engineer

Enclosure
Copy Furnished:
Honorable Olympia J. Snowe
Suite 7B, 2 Great Falls Plaza
Auburn, Maine 04210